FILE C

Mathematics

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Item Information and Scoring Guide Reference Sheet

The following pages are designed to assist you in understanding how Maine Educational Assessment (MEA) items are scored. These pages contain the text for each released item accompanied by the following information.

Multiple-Choice Items

The boxes containing the multiple-choice items also contain the percent of students statewide who chose each answer option. The correct option is asterisked(*).

- **MC#:** the multiple-choice item position in the Class Analysis Report
  One point may be earned for a multiple-choice item.
- **Key:** the letter of the correct answer for the multiple-choice item
- **Calculator:** indication of whether a calculator was an allowed tool in the session during which the item was administered
- **Cluster:** the cluster the item measured
- **Content Standard:** the content standard that the item measured
- **Performance Indicator:** the performance indicator that the item measured

Short-Answer Items

- **SA#:** the short-answer item position in the Class Analysis Report
  Up to two points may be earned for a short-answer item.
- **Calculator:** indication of whether a calculator was an allowed tool in the session during which the item was administered
- **Cluster:** the cluster the item measured
- **Content Standard:** the content standard that the item measured
- **Performance Indicator:** the performance indicator that the item measured
- **Short-Answer Scoring Guide:** the description of each score point used to determine the score, including the percent of students statewide who received each score and the statewide average student score
- **Training Notes:** in-depth descriptions or particular information used to determine the score
- **Annotated Student Response:** sample student response for each score point with annotations that explain the reasoning behind the assigned score

Item Information and Scoring Guide Reference Sheet

Constructed-Response Items

- **CR#:** the constructed-response item position in the Class Analysis Report
  Up to four points may be earned for a constructed-response item.
- **Calculator:** indication of whether a calculator was an allowed tool in the session during which the item was administered
- **Cluster:** the cluster the item measured
- **Content Standard:** the content standard that the item measured
- **Performance Indicator:** the performance indicator that the item measured
- **Constructed-Response Scoring Guide:** the description of each score point used to determine the score, including the percent of students statewide who received each score and the statewide average student score
- **Training Notes:** in-depth descriptions or particular information used to determine the score
- **Annotated Student Response:** sample student response for each score point with annotations that explain the reasoning behind the assigned score

MEA 2005–2006

Mathematics Grade 4

The table below shows the entire MEA mathematics test design. Half of the common items are released and can be found in this document. Item information for all item types, scoring information (average scores, guides, and training notes) for all short-answer and constructed-response items, and annotated student responses follow.

2005–2006 MEA MATHEMATICS TEST DESIGN

Content Area	Common			Embedded Field Test			Total Items per Student			Testing Time	Points
	MC	CR	SA	MC	CR	SA	MC	CR	SA		
Mathematics	32	1	6	8	1	2	40	2	8	90 min.	48

Each item on the MEA measures a content standard and performance indicator from Maine's *Learning Results*. Score points for items are accumulated and reported in clusters. Each content standard is included in a cluster as indicated below.

Mathematics Clusters

1. Numbers and Operations
- Numbers and Number Sense
- Computation
- Discrete Mathematics

2. Shape and Size
- Geometry
- Measurement

3. Mathematical Decision Making
- Data Analysis and Statistics
- Probability
- Mathematical Reasoning

4. Patterns
- Patterns, Relations, and Functions
- Algebra Concepts
- Mathematical Communication

1. Ms. Murphy has one box that weighs 125 pounds and 3 boxes that weigh 65 pounds each. How much do the boxes weigh in all?

24%	A. 190 pounds
10%	B. 220 pounds
8%	C. 310 pounds
*57%	D. 320 pounds

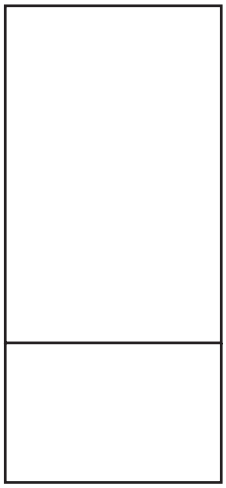
MC#: 1
Key: D
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard B: Computation - Students will understand and demonstrate computation skills.
Performance Indicator: B1 - Students will be able to solve multi-step, real-life problems using the four operations with whole numbers.

2. Jed is rolling a number cube with sides numbered 1, 2, 3, 4, 5, and 6. Which kind of number is Jed most likely to get?

13%	A.	an even number
9%	B.	an odd number
*75%	C.	a number that is greater than 2
3%	D.	a number that is less than 2

MC#: 2
Key: C
Calculator: Not Allowed
Cluster: Mathematical Decision Making
Content Standard D: Probability - Students will understand and apply concepts of probability.
Performance Indicator: D1 - Students will be able to explain the concept of chance in predicting outcomes.

3. Ken drew a picture of one of the windows in his house.



Which shapes is the window made from?

3%	A. two squares
*56%	B. two rectangles
39%	C. a square and a rectangle
2%	D. a rectangle and a triangle

MC#: 3
Key: B
Calculator: Not Allowed
Cluster: Shape and Size
Content Standard E: Geometry - Students will understand and apply concepts from geometry.
Performance Indicator: E1 - Students will be able to describe, model, and classify shapes and figures using applicable properties.

4. The gym teacher puts 24 children into 8 teams. Each team has the same number of children. How many children are on each team?

*78%	A. 3
10%	B. 4
2%	C. 5
9%	D. 6

MC#: 4
Key: A
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard B: Computation - Students will understand and demonstrate computation skills.
Performance Indicator: B4 - Students will be able to develop proficiency with the facts and algorithms of the four operations on whole numbers using mental math and a variety of materials, strategies, and technologies.

5. The chart below shows the temperature at noon during a week in January.

Day	Temperature
Monday	0°F
Tuesday	6°F
Wednesday	–2°F
Thursday	–8°F
Friday	8°F

Which day was the coldest?

16% A. Monday
3% B. Tuesday
9% C. Wednesday
*72% D. Thursday

MC#: 5
Key: D
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard A: Numbers and Number Sense - Students will understand and demonstrate a sense of what numbers mean and how they are used.
Performance Indicator: A3 - Students will be able to demonstrate knowledge of the meaning of decimals and integers and an understanding of how they may be used.

6. Maria bought two books. One cost $3.97, and the other cost $2.00. She paid with a ten-dollar bill. How much change should she get?

*58%	A.	$4.03
5%	B.	$4.17
25%	C.	$5.03
12%	D.	$5.17

MC#: 6
Key: A
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard B: Computation - Students will understand and demonstrate computation skills.
Performance Indicator: B1 - Students will be able to solve multi-step, real-life problems using the four operations with whole numbers.

7. Look at the sentence below.

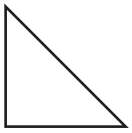
$\square \times 0 = 2$

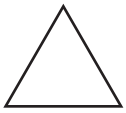
How many numbers can be put in the box to make a true sentence?

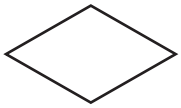
*71%	A. none
10%	B. 1
14%	C. 2
4%	D. more than 2

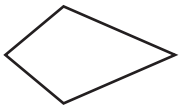
MC#: 7
Key: A
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard I: Discrete Mathematics - Students will understand and apply discrete mathematics.
Performance Indicator: I2 - Students will be able to give examples of infinite and finite solutions.

8. Which shape has two sides that are parallel to each other?

12% A. 

19% B. 

*58% C. 

11% D. 

MC#: 8
Key: C
Calculator: Not Allowed
Cluster: Shape and Size
Content Standard E: Geometry - Students will understand and apply concepts from geometry.
Performance Indicator: E1 - Students will be able to describe, model, and classify shapes and figures using applicable properties.

9. Lori knows that less than one hundred thousand people live in Saco. Which of the following is the greatest whole number that could be the number of people who live in Saco?

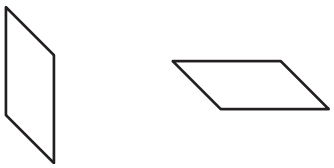
15%	A.	999
17%	B.	9,999
*49%	C.	99,999
20%	D.	999,999

MC#: 9
Key: C
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard A: Numbers and Number Sense - Students will understand and demonstrate a sense of what numbers mean and how they are used.
Performance Indicator: A1 - Students will be able to read, compare, order, classify, and explain whole numbers up to one million.

10. Which pair of shapes shows a slide?

19% A.

10% B.



9% C.

*61% D.

MC#: 10
Key: D
Calculator: Not Allowed
Cluster: Shape and Size
Content Standard E: Geometry - Students will understand and apply concepts from geometry.
Performance Indicator: E3 - Students will be able to use transformations such as slides, flips, and rotations.

11. If $\square \times 4 = 12$, which sentence below must be true?

16%	A.	$12 \times 4 = \square$
8%	B.	$12 \times \square = 4$
21%	C.	$\square \div 12 = 4$
*55%	D.	$12 \div 4 = \square$

MC#: 11
Key: D
Calculator: Not Allowed
Cluster: Patterns
Content Standard G: Patterns, Relations, and Functions - Students will understand that mathematics is the science of patterns, relationships, and functions.
Performance Indicator: G2 - Students will be able to use variables and open sentences to express relationships

12. Which list is in order from LEAST to GREATEST?

41%	A.	$\frac{1}{2}, \frac{1}{4}, \frac{3}{4}$
*36%	B.	$\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$
14%	C.	$\frac{1}{4}, \frac{3}{4}, \frac{1}{2}$
8%	D.	$\frac{1}{2}, \frac{3}{4}, \frac{1}{4}$

MC#: 12
Key: B
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard A: Numbers and Number Sense - Students will understand and demonstrate a sense of what numbers mean and how they are used.
Performance Indicator: A2 - Students will be able to read, compare, order, classify, and explain simple fractions through tenths.

13. Kristi says that SOME multiples of 5 are odd numbers.

    a. Give an example of a multiple of 5 that is an odd number.

    Sam says that ALL multiples of 5 are odd numbers.

    b. Give an example of a number that shows that Sam is not correct. Explain your answer.

SA#: 13
Calculator: Not Allowed
Cluster: Mathematical Decision Making
Content Standard J: Mathematical Reasoning - Students will understand and apply concepts of mathematical reasoning.
Performance Indicator: J1 - Students will be able to demonstrate an understanding that support for a claim should be based on evidence of various types (e.g., from logical processes, from measurement, or from observation and experimentation).

SHORT-ANSWER SCORING GUIDE

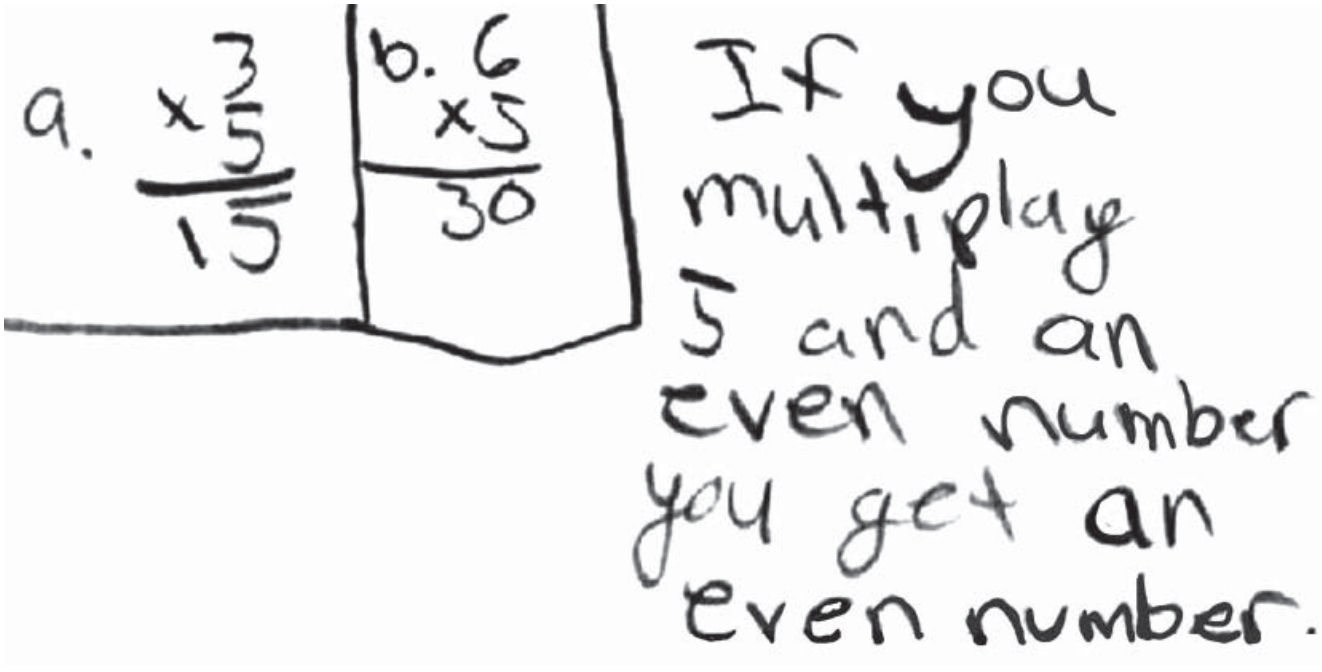
Percentage of Statewide Student Scores	Score	Description
49%	2	2 points
24%	1	1 point
25%	0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
1%	Blank	No response.
1.22	Statewide average student score.	

Training Notes for Short-Answer Item 13

1 point for correct examples in both parts (part a: 5, 15, 25, etc.; part b: 10, 20, 30, etc.)
AND
1 point for explanation in part b (e.g. 20 is a multiple of 5, since $4 \times 5 = 20$, but 20 is even since it ends in 0)

Sample 2-Point Response with Annotations for Short-Answer Item 13

13.

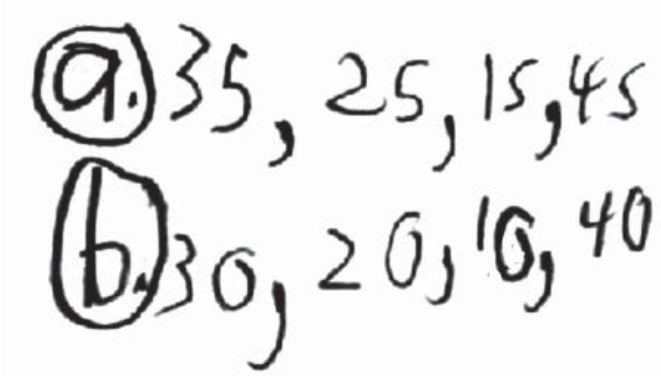


Summary annotation statement:

This student's response receives 1 point for providing the correct examples in parts a and b, and earns 1 point for providing the correct explanation in part b explaining that "If you multiplay 5 and an even number you get an even number." Using the scoring guide, 2 total points earns a score point 2.

Sample 1-Point Response with Annotations for Short-Answer Item 13

13.

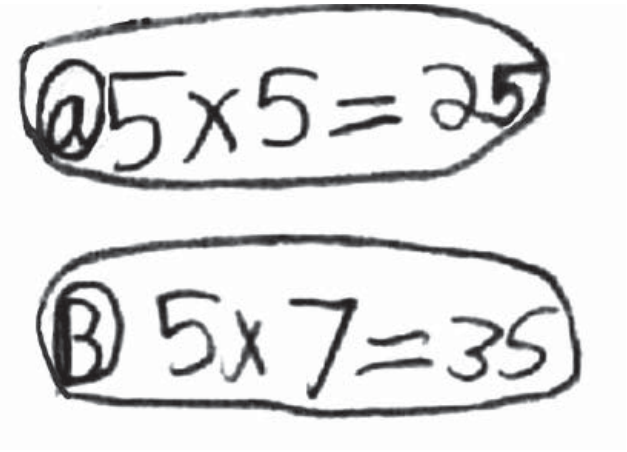


Summary annotation statement:

This student's response earns 1 point for providing the correct examples in parts a and b, but did not provide an explanation in part b and receives no points for part b. According to the scoring guide, 1 total point earns a score point 1.

Sample 0-Point Response with Annotations for Short-Answer Item 13

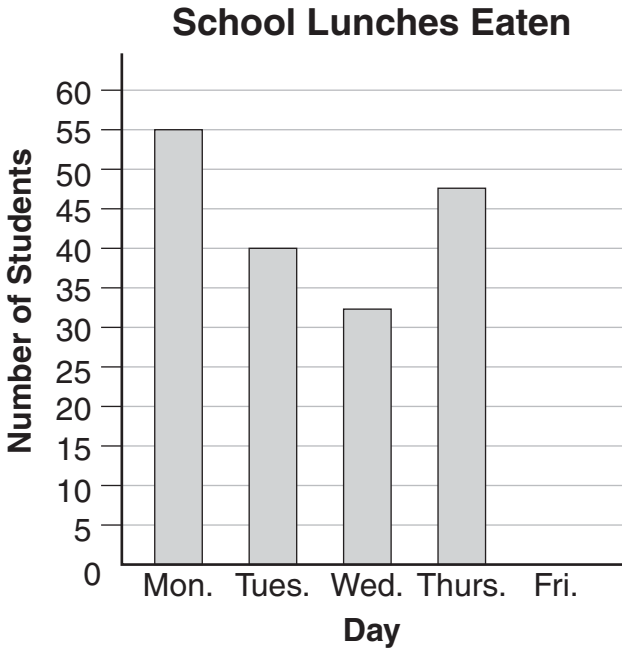
13.



Summary annotation statement:

This student's response provides a correct example for part a and an incorrect answer for part b. A correct answer for both parts is required for 1 point. There is no explanation in part b.

14. This graph shows how many students ate a school lunch during the first four days of last week.



a. How many students ate a school lunch on Tuesday?

b. How many MORE students ate a school lunch on Monday than on Tuesday?

c. On Friday the number of students who ate a school lunch was not the most or the least for the whole week. How many students could have eaten a school lunch on Friday? Show your work or explain how you know.

CR#: 14
Calculator: Not Allowed
Cluster: Mathematical Decision Making
Content Standard C: Data Analysis and Statistics- Students will understand and apply concepts of data analysis.
Performance Indicator: C2 - Students will be able to read and interpret displays of data.

Percentage of Statewide Student Scores	Score	Description
13%	4	4 points
31%	3	3 points
40%	2	2 points
13%	1	1 point OR Minimal understanding of reading and interpreting bar graphs.
2%	0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
2%	Blank	No response.
2.36	Statewide average student score.	

Training Notes for Constructed-Response Item 14

Part a: 1 point correct answer (40)

Part b: 1 point correct answer (15)

Part c: 1 point correct answer (any number that is more than 32 and less than 55)
AND
1 point explanation or strategy (lowest was Wed. at 32 or 33, highest was Monday at 55)

Note: Scorers should read along with the student. If the student makes an error in a previous part and subsequent errors are correct based on the earlier error, the student should not be penalized again.

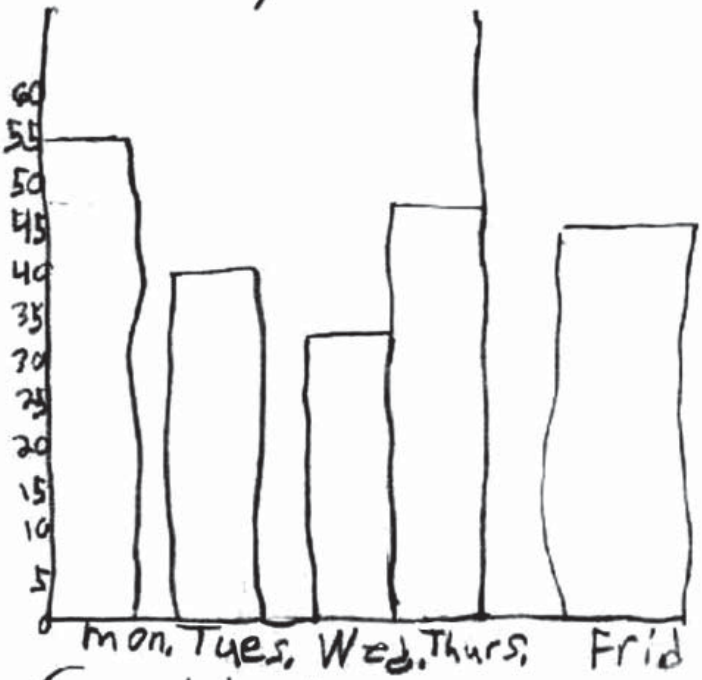
Sample 4-Point Response with Annotations for Constructed-Response Item 14

14.

A. 40 Students ate scool lunch.

B. 15 more students ate school lun on Monday then Tuesday.

C.



It Could have been in betwen 55 and 32. I pickes 45.

Summary annotation statement:

This student's response earns 1 point for each correct answer in parts a, b, and c. It also earns 1 point in part c for showing a correct explanation and strategy. According to the scoring guide, 4 total points earns a score point 4.

14.

a 40 students ate school lunch on Tuesday.

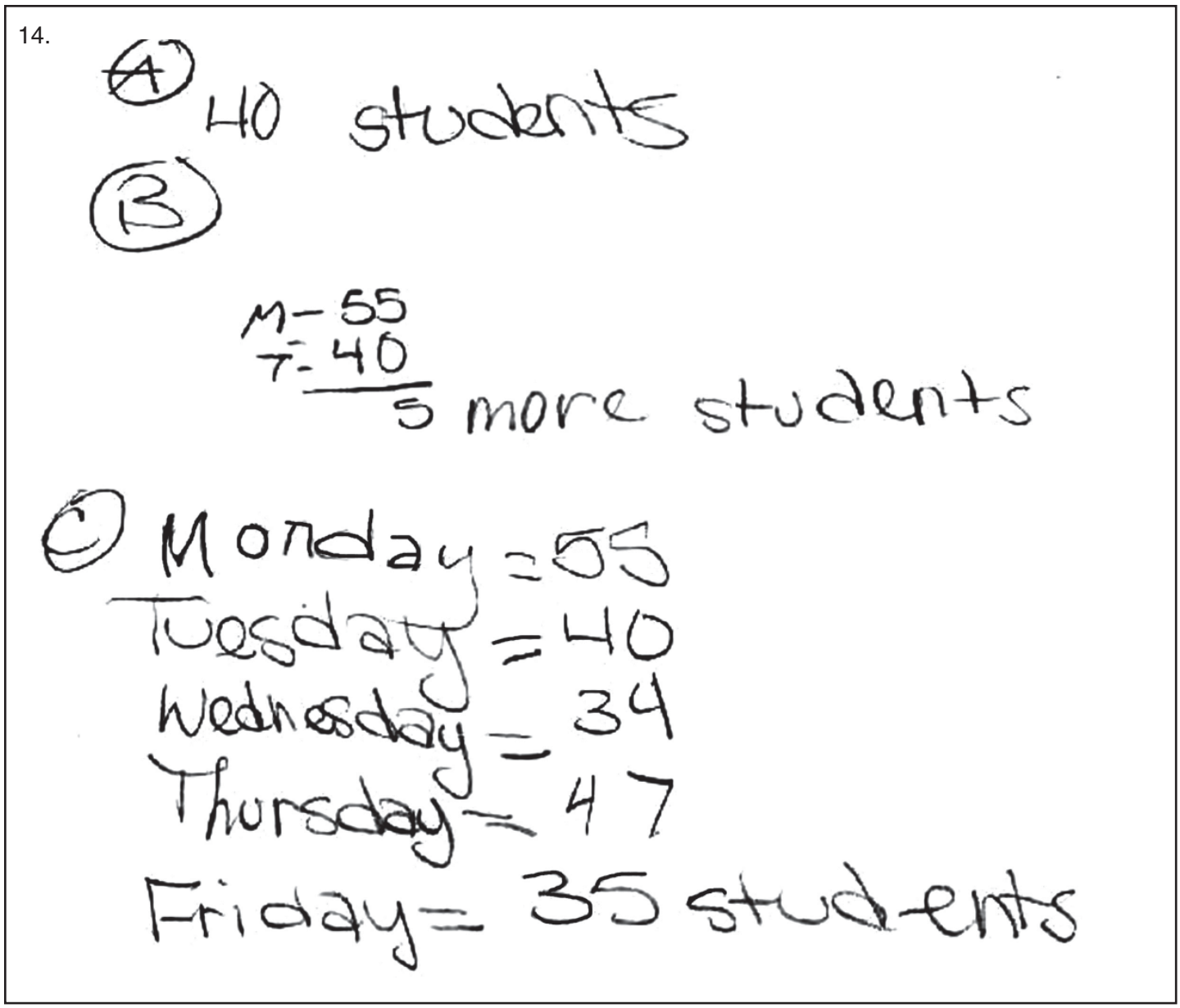
B 15 more students ate a school lunch on Monday than Tuesday.!

C 45 students could have had a School lunch on Friday because 45 is a little bit in the middle and is not the least or greatest!

Summary annotation statement:

This student's response receives 1 point for each correct answer in parts a, b, and c. The explanation in part c earns no points because it just restates information given in the question. According to the scoring guide, a total of 3 points earns a score point 3.

Sample 2-Point Response with Annotations for Constructed-Response Item 14

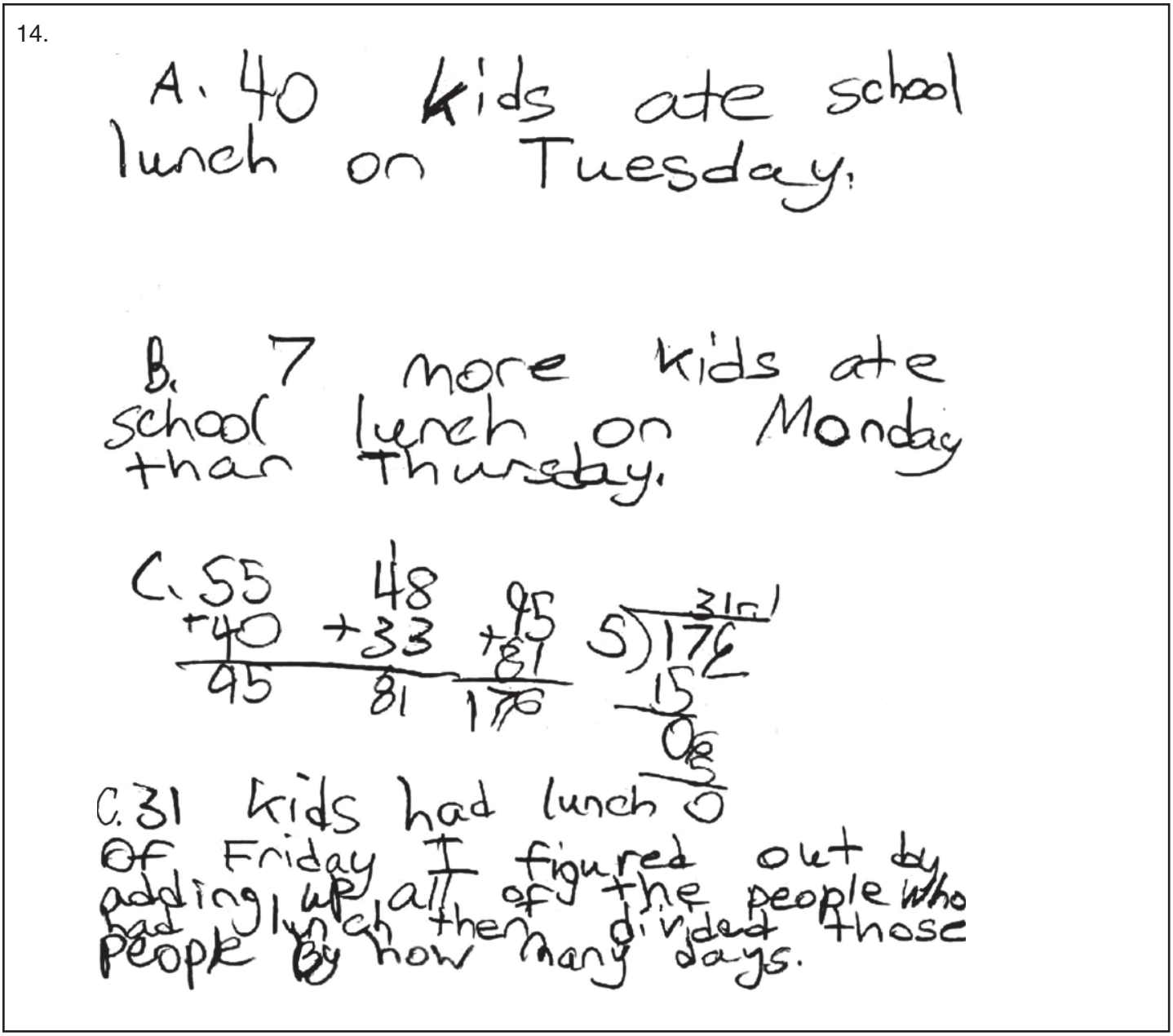


Summary annotation statement:

The student's response earns 1 point for a correct answer in part a, zero points for an incorrect answer in part b, and 1 point for a correct answer in part c. The explanation or strategy in part c does not earn a point because it is incomplete; there is no reasoning given. The information in part c for Monday through Thursday is restated from the item. According to the scoring guide, 2 total points are a score point 2.

Sample 1-Point Response with Annotations for Constructed-Response Item 14

14.

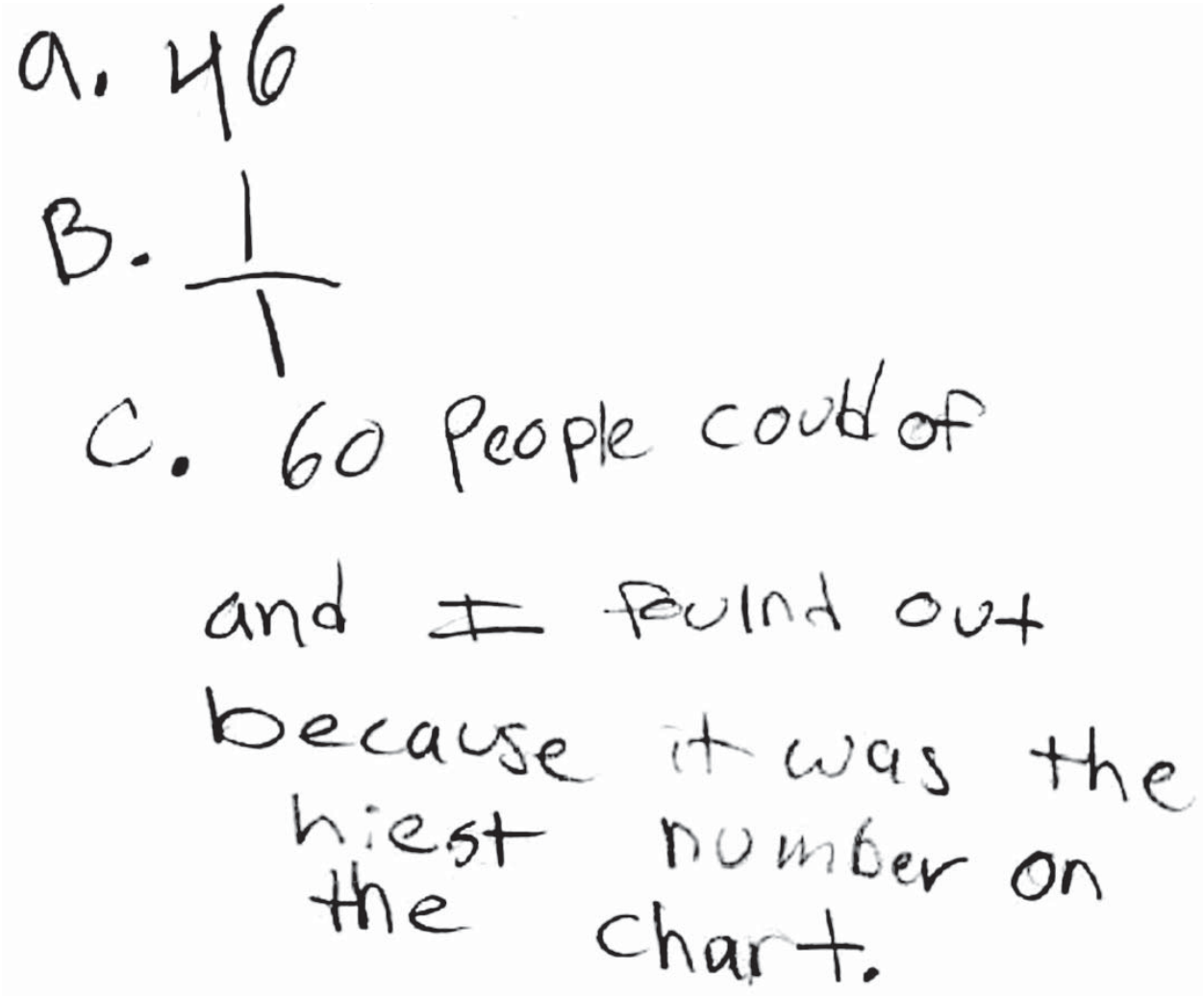


Summary annotation statement:

This student's response receives 1 point for the correct answer in part a only. He or she provided the incorrect answers for parts b and c, and an incorrect explanation in part c. Using the scoring guide, 1 total point earns a score point 1.

Sample 0-Point Response with Annotations for Constructed-Response Item 14

14.



Summary annotation statement:

This student's response is a score point 0 because the student provides incorrect answers for all parts and an incorrect explanation in part c.

15. Larry is growing beans. After five days, a small sprout appears. Which is the best unit to measure the height of the bean sprout?

*83%	A.	centimeter
7%	B.	kilometer
8%	C.	meter
2%	D.	liter

MC#: 15
Key: A
Calculator: Allowed
Cluster: Shape and Size
Content Standard F: Measurement - Students will understand and demonstrate measurement skills.
Performance Indicator: F2 - Students will be able to select measuring tools and units of measurement that are appropriate for what is being measured.

16. In the sentence below, m stands for Mike's age and r stands for Ron's age.

$$r = m - 7$$

How old is Ron when Mike is 9 years old?

*61%	A.	2
19%	B.	7
8%	C.	9
12%	D.	16

MC#: 16
Key: A
Calculator: Allowed
Cluster: Patterns
Content Standard H: Algebra Concepts - Students will understand and apply algebraic concepts.
Performance Indicator: H1 - Students will be able to develop and evaluate simple formulas in problem-solving contexts.

17. This is the real size of Sarah's crayon.

How long is the crayon?

9%	A. 8 centimeters
*85%	B. 7 centimeters
2%	C. 6 inches
4%	D. 4 inches

MC#: 17
Key: B
Calculator: Allowed
Cluster: Shape and Size
Content Standard F: Measurement - Students will understand and demonstrate measurement skills.
Performance Indicator: F1 - Students will be able to solve and justify solutions to real-life problems involving the measurement of time, length, area, perimeter, weight, temperature, mass, capacity, and volume.

□ × □ = **16**

□ × △ = **24**

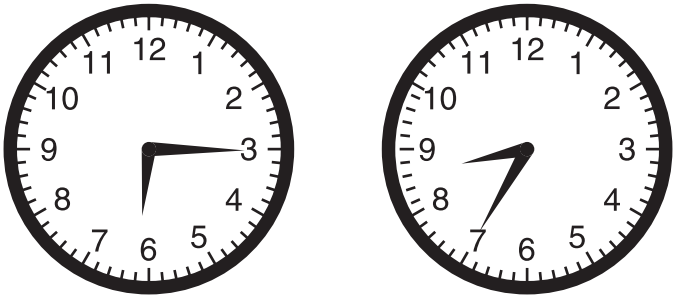
18. In the equations above, each shape represents a single number. Which number does △ represent?

24%	A. 8
*47%	B. 6
4%	C. 5
25%	D. 4

MC#: 18
Key: B
Calculator: Allowed
Cluster: Patterns
Content Standard H: Algebra Concepts - Students will understand and apply algebraic concepts.
Performance Indicator: H2 - Students will be able to find replacements for variables that make simple number sentences true.

19. The clocks below show the starting and ending times for Aaron's game last night.

Start **End**



a. How long did Aaron's game last?

At the end of the game Aaron waited $\frac{1}{2}$ hour for his ride to pick him up.

b. At what time did Aaron's ride pick him up?

SA#: 19
Calculator: Allowed
Cluster: Shape and Size
Content Standard F: Measurement - Students will understand and demonstrate measurement skills.
Performance Indicator: F1 - Students will be able to solve and justify solutions to real-life problems involving the measurement of time, length, area, perimeter, weight, temperature, mass, capacity, and volume.

Percentage of Statewide Student Scores	Score	Description
23%	2	2 points
30%	1	1 point
44%	0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
3%	Blank	No response.
.76	Statewide average student score.	

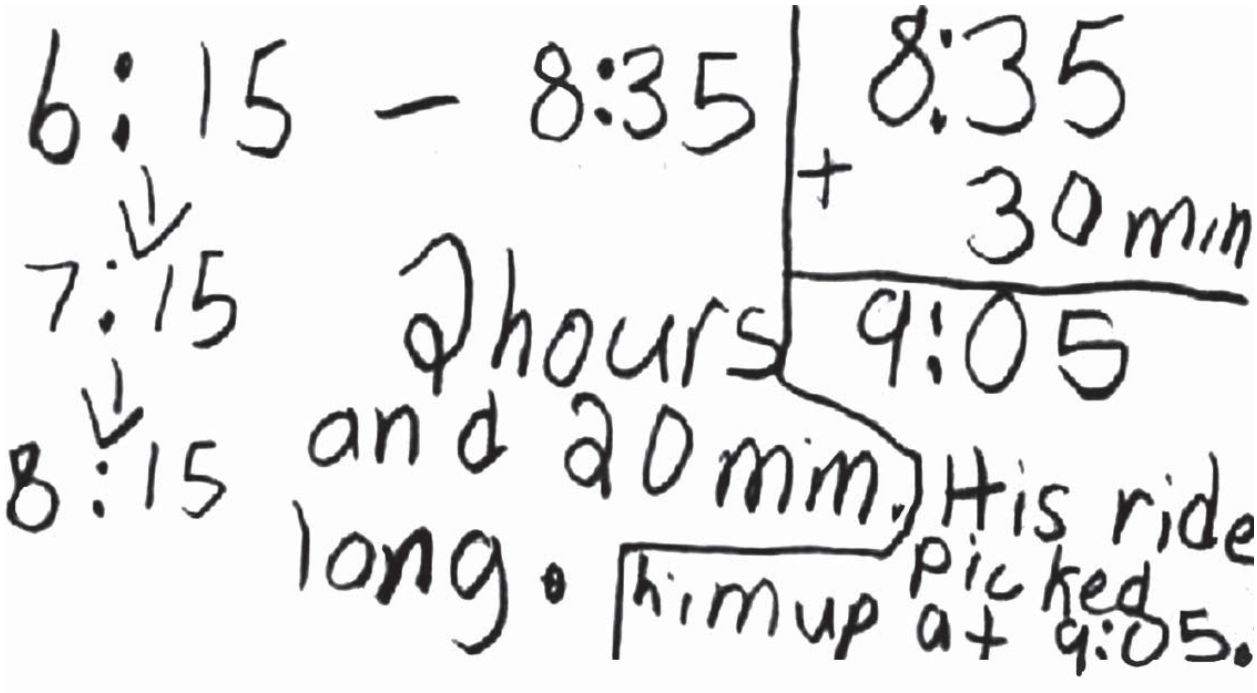
Training Notes for Short-Answer Item 19

Part a: 1 point for correct answer, 2 hours and 20 minutes

Part b: 1 point for correct answer, 9:05

Sample 2-Point Response with Annotations for Short-Answer Item 19

19.

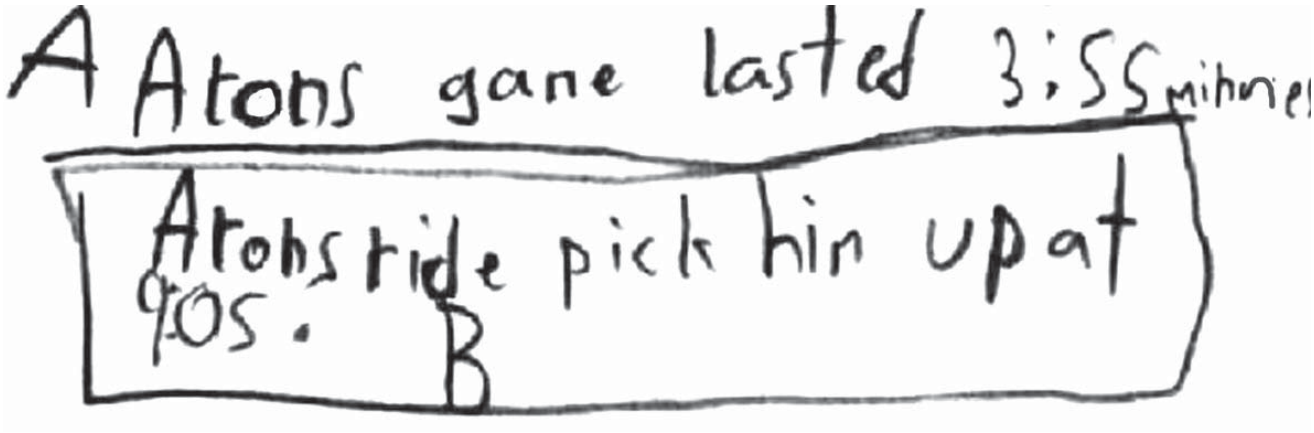


Summary annotation statement:

This student's response receives 1 point for the correct answer of 2 hours and 20 minutes in part a, and 1 point for the correct answer of 9:05 in part b.

Sample 1-Point Response with Annotations for Short-Answer Item 19

19.

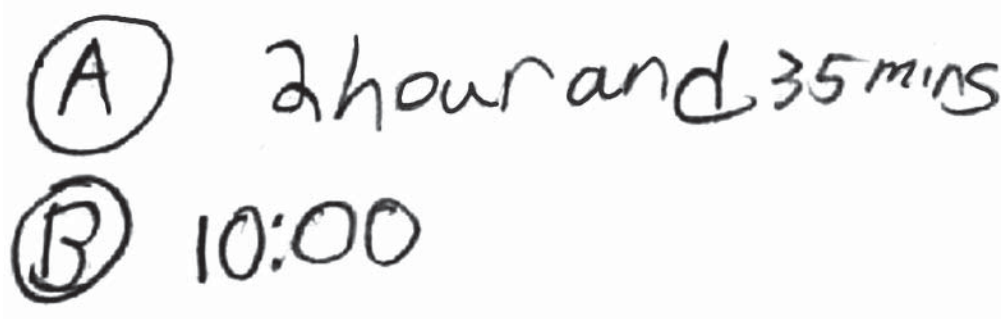


Summary annotation statement:

This student's response receives no points in part a for providing the incorrect answer, and earns 1 point in part b for the correct answer.

Sample 0-Point Response with Annotations for Short-Answer Item 19

19.



Summary annotation statement:

The answers in both parts a and b are incorrect.

20. Mr. Mills wants to put a line of students into three groups. He will ask the students to count off by threes, starting with the first student in line. Those who say “one” will be in Group 1. Those who say “two” will be in Group 2. Those who say “three” will be in Group 3.

    Nate is the 11th student in line. In which group will Nate be? Explain your answer.

SA#: 20
Calculator: Allowed
Cluster: Patterns
Content Standard G: Patterns, Relations, and Functions - Students will understand that mathematics is the science of patterns, relationships, and functions.
Performance Indicator: G1 - Students will be able to use the patterns of numbers, geometry, and a variety of graphs to solve a problem.

Percentage of Statewide Student Scores	Score	Description
51%	2	2 points
24%	1	1 point
21%	0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
5%	Blank	No response.
1.25	Statewide average student score.	

Training Notes for Short-Answer Item 20

1 point for correct answer (Group 2)

AND

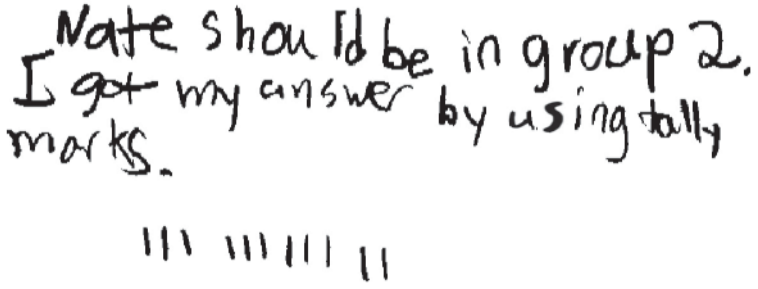
1 point for reasonable explanation, which may be in the form of a diagram or picture

Sample Solution:

Student #	1	2	3	4	5	6	7	8	9	10	Nate
Group #	1	2	3	1	2	3	1	2	3	1	2

Sample 2-Point Response with Annotations for Short-Answer Item 20

20.

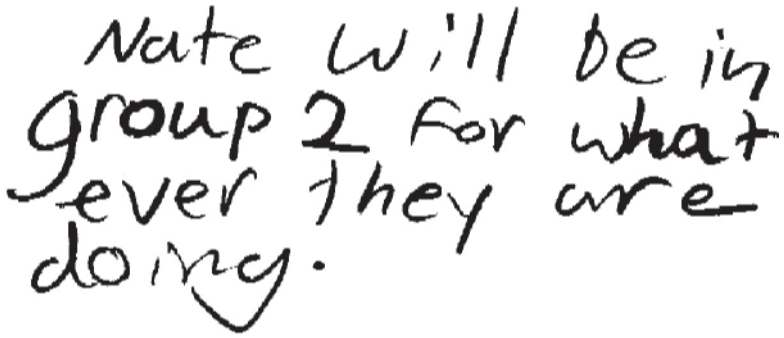


Summary annotation statement:

This student's response is awarded 2 points for providing the correct answer and the correct work that demonstrates how he or she arrived at the answer. Using the scoring guide, 2 total points earns a score point 2.

Sample 1-Point Response with Annotations for Short-Answer Item 20

20.

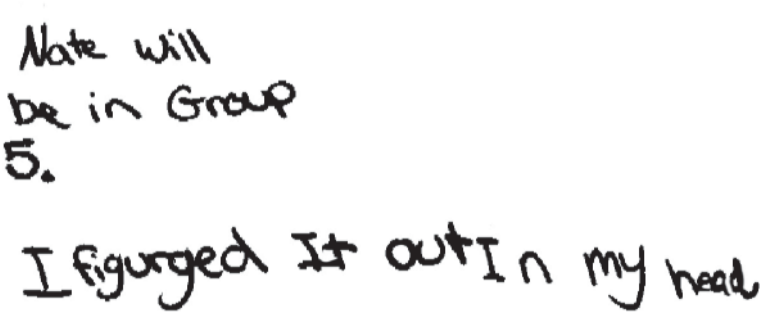


Summary annotation statement:

The student earns 1 point for providing the correct answer, but does not explain his or her answer or provide work. According to the scoring guide, 1 total point is a score point 1.

Sample 0-Point Response with Annotations for Short-Answer Item 20

20.



Summary annotation statement:

The student provides an incorrect answer and insufficient explanation.